TITLE OF THE INVENTION

A STEERING COLUMN ASSEMBLY FOR A VEHICLE

BACKGROUND OF THE INVENTION

[0001] This invention relates to a steering column assembly for vehicle and in particular relates to a bearing arrangement for a rake and reach adjustable steering column.

SUMMARY OF THE INVENTION

[0002] According to the present invention, there is provided a steering column assembly for a vehicle, including an upper column assembly, a lower column assembly and a central collapsible steering column passing through the upper and lower column assemblies; there being a central bearing comprising a cylindrical tube that surrounds said central collapsible steering column, that is slidably mounted in said upper column assembly and that rotatably supports said central collapsible steering column at its lower end.

[0003] The central bearing may be made of a plastics material.

[0004] The central bearing may be a molded thermoplastics tube.

[0005] The plastics tube may be a molded glass or carbon fiber-filled thermoplastics tube.

[0006] The steering column assembly can be rake and/or reach adjustable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Fig. 1 is a diagrammatic plan view of part of a steering column assembly for a vehicle;

Fig. 2 is a side view of the assembly shown in Fig. 1;

Fig. 3 is a longitudinal sectional view of part of the assembly shown in Figs. 1 and 2;

Fig. 4 is an exploded perspective view of part of the assembly shown in Figs. 1 to 3; and

Fig. 5 is a perspective assembled view of that part of the assembly shown in Fig. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0008] Referring to the drawings, the steering column assembly includes an intermediate steering column drive shaft 1 for connection at its lower end to a universal joint 2 with a lower steering column drive shaft (not shown), the intermediate drive shaft 1 being coupled

through a universal joint 3 at its upper end to a central drive shaft 4 that passes through a steering column mounting bracket 5. The upper end of the central column drive shaft 4, remote from the universal joint 3, has means for mounting a steering wheel (not shown) on it.

[0009] The central drive shaft 4 is rake and/or reach adjustable by means of an adjustment assembly 6 including a clamping mechanism.

[0010] The steering column mounting bracket is mounted at locations 7 to a vehicle cross car beam (not shown). Figs. 1 and 2 also show a top lock assembly 8 to which the adjusting assembly 6 is mounted. The top lock assembly 8 includes a cylindrical lock housing bore 9.

[0011] The central steering column 4 is also arranged to be collapsible in the event of vehicle crash and is mounted in two rotary bearings 10A and 10B (Fig. 3) each connecting the central steering column 4 to the upper and lower mounting members 7 of the mounting bracket 5.

[0012] An axially concentric tube-in-tube slidable center bearing system is provided which allows static/dynamic axial displacement of the lower mounting bracket mounting relative to the upper mounting bracket mounting for driver-initiated reach adjustment of the steering shaft and wheel assembly and dynamic ride-down displacement top towards bottom in the event of a vehicle (head-on) crash.

[0013] The present steering column assembly includes a slidable center bearing construction in the upper steering column assembly which comprises a cylindrical tube 11 of plastics material such as a thermo-molded

plastics acetal material which is flexibly attached to a lateral mounting bracket 12 at a lower end of the mounting bracket 5 and is axially located in, and slidably through, a bore 13 of the lock housing assembly 9 at the upper end of the mounting bracket 5. The tube 11 may alternatively be made from a glass or carbon-fibre-filled plastics acetal medium in order to obtain an enhanced bending stiffness from increase in the modular elasticity leading to a higher natural frequency of vibration for the steering column. Since the tube 11 is of plastics material, it can be precision molded so as to allow the component readily to make an operational slide fit within the bore 13 (which is machined) of the housing of the lock assembly 9.

[0014] Furthermore, the material of the plastics tube 11 allows for a natural lubrication effect leading to a relatively low co-efficient of surface friction which assists in the provision of a low static breakaway and column ride-down force in the event of vehicle crash. It also accordingly has a low density when compared with conventional metallic materials, which provides weight reduction benefit.

[0015] A bush liner 14 is provided to fit about the lower end of the plastics tube 11, the liner upon assembly fitting within the lateral mounting bracket 12 of the mounting bracket 5.